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ABSTRACT

The United States Training and Employment Service General Aptitude Test Battery (GATB), first published in 1947, has been included in a continuing program of research to validate the tests against success in many different occupations. The GATB consists of 12 tests which measure nine aptitudes: General Learning Ability; Verbal Aptitude; Numerical Aptitude; Spatial Aptitude; Form Perception; Clerical Perception; Motor Coordination; Finger Dexterity; and Manual Dexterity. The aptitude scores are standard scores with 100 as the average for the general working population, and a standard deviation of 20. Occupational norms are established in terms of minimum qualifying scores for each of the significant aptitude measures which, when combined, predict job performance. Cutting scores are set only for those aptitudes which aid in predicting the performance of the job duties of the experimental sample. The GATB norms described are appropriate only for jobs with content similar to that shown in the job description presented in this report. A description of the validation sample and a personnel evaluation form are also included. (AG)

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May 1970

U.S. Training and Employment Service
Technical Report
S-449

Development of USTES

APTITUDE TEST BATTERY FOR

COOK, SHORT ORDER

(hotel & rest.)
314.381

U.S. DEPARTMENT OF LABOR
Manpower Administration

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Technical Report on Development of USTES Aptitude Test Battery for . . . . . .

Cook, Short Order (hotel & rest.) 314.381

S-449

(Developed in Cooperation with the
Pennsylvania State Employment Service)

U. S. Department of Labor
Manpower Administration

May 1970

FORWORD

The United States Training and Employment Service General Aptitude Test Battery (GATB) was first published in 1947. Since that time the GATB has been included in a continuing program of research to validate the tests against success in many different occupations. Because of its extensive research base the GATB has come to be recognized as the best validated multiple aptitude test battery in existence for use in vocational guidance.

The GATB consists of 12 tests which measure 9 aptitudes: General Learning Ability, Verbal Aptitude, Numerical Aptitude, Spatial Aptitude, Form Perception, Clerical Perception, Motor Coordination, Finger Dexterity, and Manual Dexterity. The aptitude scores are standard scores with 100 as the average for the general working population, with a standard deviation of 20.

Occupational norms are established in terms of minimum qualifying scores for each of the significant aptitude measures which, in combination, predict job performance. For any given occupation, cutting scores are set only for those aptitudes which contribute to the prediction of performance of the job duties of the experimental sample. It is important to recognize that another job might have the same job title but the job content might not be similar. The GATB norms described in this report are appropriate for use only for jobs with content similar to that shown in the job description included in this report.

 GATB Study #2778

DEVELOPMENT OF USTES APTITUDE TEST BATTERY

for

Cook, Short Order (hotel & rest.) 314.381-010

S-449

This report describes the research undertaken for the purpose of developing General Aptitude Test Battery (GATB) norms for the occupation of Cook, Short Order (hotel & rest.) 314.381-010. The following norms were established:

GATB Aptitudes	Minimum Acceptable GATB Scores
S - Spatial Aptitude	70
P - Form Perception	80
Q - Clerical Perception	80

RESEARCH SUMMARY

Sample:

46 trainees (18 male and 28 female) enrolled in a 28 week training program under MDTA in Pittsburgh, Pennsylvania. 31 members of the scope were Negro.

Criterion:

Instructor's ratings

Design:

Longitudinal (test data were collected prior to the beginning of the training and criteriondata were collected at the end of the 28 week course).

Minimum aptitude requirements were determined on the basis of job analysis, and statistical analyses of aptitude mean scores, standard deviations, aptitude-criterion correlations, and selective efficiencies.

Predictive Validity:

Phi Coefficient=.49 ($P/2 < .0005$)

Effectiveness of Norms:

Only 65% of the non-test-selected trainees used for this study were good trainees; if the trainees had been test-selected with the above norms, 86% would have been good trainees. 35% of the non-test-selected trainees used for this study were poor trainees; if the trainees had been test-selected with the above norms, only 14% would have been poor trainees. The effectiveness of the norms is shown graphically in Table 1:

TABLE 1

Effectiveness of Norms

	Without Tests	With Tests
Good Trainees	65%	86%
Poor Trainees	35%	14%

SAMPLE DESCRIPTION

Size:

N = 46

Occupational Status:

MDTA Trainees

Working Setting:

Trainees were enrolled in a 28 week training program under the Manpower Development Training Act.

Selection Requirements:

Education: Completion of eighth grade

Previous Experience: None required

Tests: None

Other: Ability to read and write

Principal Activities:

The job duties for this occupation are those shown in the job description in the Appendix.

Minimum Experience:

Trainees were tested prior to the beginning of the MDTA training program.

TABLE 2

Means, Standard Deviations (SD), Ranges, and Pearson Product-Moment Correlations with the Criterion (r) for Age and Education

	Mean	SD	Range	r
Age (years)	30.1	11.8	18-57	-.355
Education (years)	10.0	1.3	8-12	.023

EXPERIMENTAL TEST BATTERY

All twelve tests of the GATB, B-1002A, were administered to the validation sample during the period 1963 through 1967.

CRITERION

The criterion data consisted of the instructor's ratings of job proficiency made at the end of the training program.

Rating Scale:

USTES Form SP 21T, Descriptive Rating Scale for Trainees (see appendix). The scale consists of seven items with five alternatives for each item. The alternatives indicate the different degrees of job proficiency.

Realibility:

Since only one rating was obtained, no external criterion realibility was established. However, internal consistancy realiability was established by correlating item G with the total score of all other items on the rating scale. This comparison resulted in a correlation of .807.

Criterion Score Distribution:

Possible Range:	7-35
Actual Ranger	8-31
Mean:	19.8
Standard Deviation:	5.8

Criterion Dichotomy:

The criterion distribution was dichotomized by the test development analyst into high and low groups by placing 35% of the sample in the low criterion group to correspond with the percentage of trainees considered marginal or unsatisfactory. Trainees in the high criterion group were designated as "good trainees" and those in the low criterion group as "poor trainees." The critical criterion score is 18.

APTITUDES CONSIDERED FOR INCLUSION IN THE NORMS

Aptitudes were selected for tryout on the basis of a qualitative analysis of job duties involved and a statistical analysis of test and criterion data. Tables 3, 4, and 5 show the results of the qualitative and statistical analyses.

TABLE 3

Qualitative Analysis

(Based on the job description and observation of the job, the aptitudes indicated appear to be important to the work performed.)

Aptitude	Rationale
G - General Learning Ability	Must be able to understand and follow instructions and plan work.
K - Motor Coordination	Must be able to coordinate eye and hand movements rapidly and accurately, especially during rush meal periods. Must be able to perform several operations at once.
M - Manual Dexterity	Must have good dexterity in manipulating and preparing food.

TABLE 4

Means, Standard Deviations (SD), Ranges, and Pearson Product-Moment Correlations with the Criterion (r) for the Aptitudes of the GATB.

N = 46

Aptitude	Mean	SD	Range	r
G - General Learning Ability	78.2	12.6	62-112	.349*
V - Verbal Aptitude	81.6	10.4	65-102	.114
N - Numerical Aptitude	74.1	14.9	50-107	.407**
S - Spatial Aptitude	85.6	16.3	58-120	.360*
P - Form Perception	88.6	18.3	52-134	.456**
Q - Clerical Perception	89.9	13.5	66-120	.334*
K - Motor Coordination	85.0	17.8	51-130	.291*
F - Finger Dexterity	82.8	23.2	36.133	.436**
M - Manual Dexterity	85.7	20.5	42-124	.500**

*Significant at the .05 level.
**Significant at the .01 level.

TABLE 5

Summary of Qualitative and Quantitative Data

Type of Evidence	Aptitudes								
	G	V	N	S	P	Q	K	F	M
Job Analysis Data									
Important	X						X		X
Irrelevant									
Relatively High Mean				X	X	X			X
Relatively Low Standard Deviation	X	X	X			X			
Significant Correlation with Criterion	X		X	X	X	X	X	X	X
Aptitudes to be Considered for Trail Norms	G		N	S	P	Q	K	F	M

DERIVATION AND VALIDITY OF NORMS

Final norms were derived on the basis of a comparison of the degree to which trial norms consisting of various combinations of Aptitudes G, N, S, P, Q, K, F, and M at trial cutting scores were able to differentiate between the 65% of the sample considered good trainees and the 35% considered poor trainees. Trial cutting scores

at the five point interval nearest to one standard deviation below the mean for each aptitude are tried because this will eliminate about one-third of the sample with three-aptitude norms. For two-aptitude norms, minimum cutting scores slightly hgiher than one standard deviation below the mean will eliminate about one-third of the sample; for four-aptitude trial norms, cutting scores of slightly lower than one standard deviation below the mean will eliminate about one-third of the sample. The Phi Coefficient was used as a basis for comparing trial norms. Norms of S-70, P-80, and Q-80 provided optimum differentiation for the occupation of Cook, Short Order (hotel & rest.) 314.381-010. The validity of the norms is shown in Table 6 and is indicated by a Phi Coefficient of .49 (statistically significant at the .0005 level).

TABLE 6

Predictive Validity of Test Norms, S-70, P-80, and Q-80

	Nonqualifying Test Scores	Qualifying Test Scores	Total
Good trainees	6	24	30
Poor Trainees	12	4	16
Total	18	28	46

Phi Coefficient (ϕ) = .49 Chi Square ($\chi^2 y$) = 11.0

Significant Level = $P/2 < .0005$

APPLICATION OF NORMS, S-70, P-80, and Q-80 TO MINORITY GROUP MEMBERS

When the norms of S-70, P-80, and Q-80 are applied to the sample of 31 minority group members only, a Phi Coefficient of .42 is obtained which is statistically significant at the .01 level.

DETERMINATION OF OCCUPATIONAL APTITUDE PATTERN

The data for this study did not meet the requirements for incorporating this occupation into any of the 62 OAP's included in the 1970 edition of Section II of the Manual for the General Aptitude Test Battery. The data for this sample will be considered for future groupings of occupations in the development of new occupational aptitude patterns.

APPENDIX

Course Outline

A. Orientation — 30 hrs.
   1. Organization and physical layout of worker area stations
   2. Personal sanitation and apparel
   3. Safety and first aid
   4. Equipment instructions
      a. Use
      b. Care and cleaning
      c. Cost and nomenclature

B. Basic Principles of Food Preparation — 120 hrs.
   1. Introduction and cooking terms
   2. Tray and short order service
   3. Composition and method of preparing foods
      a. Beverages - Hot and cold
      b. Salads, salad dressings and non-alcholic cocktails
      c. Breakfast foods - Hot and cold
      d. Side dishes - vegetables, fruits, soups
      e. Sandwiches - hot, cold, meats and cheese
      f. Meats, milk products, eggs and fish

C. Food Preparation and Instruction — 240 hrs.
   1. Use of hot plate, grill, griddle and deep fry
      a. Steaks, chops, seafood, hamburg, cheese, pancakes, waffles, toast, eggs
      b. Deep frying meals, vegetables and seafood
   2. Short order meat menus
      a. Baking, roasting and broiling
      b. Cooking, stewing, steaming and frying
   3. Short order vegetable menus
      a. Preparation, peeling, washing and cutting
      b. Cooking, steaming and stewing
      c. Baking and frying
      d. Raw

D. Steamtable Food Preparation Instruction — 30 hrs.
   1. Providing portions of vegetables
   2. Prepares serving, carving portions
      a. Meats, fish, poultry
   3. Appealing gravies, sauce or garnish

E. Auxiliary Training Instruction — 40 hrs.
   1. Food service counter
   2. Care and use of equipment
      a. Steamtable, refrigeration, cooking stove, dishwasher, soda fountain, deep-fry, griddles, grill, broiler and hot plate

3. Maintenance
    a. Disposal of waste foods
    b. Cleaning work areas and counter tops
    c. Cleaning and polishing of equipment including dishes and utensils

F. Management Instruction 20 hrs.
1. Pricing of food supplies, budgets
2. Pricing of meals
3. Management policy
4. Health and sanitation laws

Total 480 hrs.

SP-21 T

UNITED STATES EMPLOYMENT SERVICE
DESCRIPTIVE RATING SCALE FOR TRAINEES
(For Trainees Used in Aptitude Test Development Studies)

Score _____

RATING SCALE FOR _____ _____
(DOT TITLE AND CODE FOR TRAINING COURSE)

Directions: Please read "the suggestions to raters" on the back of this form then,complete this rating scale. In making your ratings, only one box should be checked for each question.

Name of trainee (print) _____
(LAST) (FIRST)

Sex: Male _____ Female _____

A. How much aptitude or facility does he have for the vocational training? (Trainee's adeptness or knack for for performing the work easily and well.)

☐ 1. Has great difficulty doing the work. Not at all suited for the training.

☐ 2. Usually has some difficulty doing the work. Not too well suited for the training.

☐ 3. Does the work without too much difficulty. Fairly well suited for the training.

☐ 4. Usually does the work without difficulty. Well suited for the training.

☐ 5. Does the work with great ease. Exceptionally well suited for the training.

B. How much ability does he have for maintaining adequate production in the vocational activity for which he was trained?

☐ 1. Capable of very low work output. Can perform only at an unsatisfactory pace.

☐ 2. Capable of low work output. Can perform at a slow pace.

☐ 3. Capable of fair work output. Can perform at an acceptable but not a fast pace.

☐ 4. Capable of high work output. Can perform at a fast pace.

☐ 5. Capable of very high work output. Can perform at an unusually fast pace.

C. How good was the quality of his work during the vocational training?

☐ 1. Performance was inferior and almost never met minimum quality standards.

☐ 2. Performance was usually acceptable but somewhat inferior in quality. The grade of his work could stand improvement.

☐ 3. Performance was acceptable but usually not superior in quality.

☐ 4. Performance was usually superior in quality.

☐ 5. Performance was almost always of the highest quality.

D. How quickly did he learn the instructional units of the vocational training?

☐ 1. Learned the work very slowly. Needed careful and repeated instructions.

☐ 2. Learned the work somewhat slower than most.

☐ 3. Learned most of the work in the usual amount of time.

☐ 4. Learned most of the work quickly.

☐ 5. Learned all of the work very rapidly. Needed only the minimum amount of training or instructions for even the difficult aspects.

E. How much ability does he have for using the equipment of the vocational training?

☐ 1. Has very limited ability. Cannot use the equipment adequately.

☐ 2. Has little ability. Can use the equipment to "get by."

☐ 3. Has a moderate amount of ability. Can use the equipment to do fair work.

☐ 4. Has high ability. Can use the equipment to do good work.

☐ 5. Has very high ability. Can use the equipment to do excellent work.

F. How large a variety of job duties can he perform efficiently?

☐ 1. Cannot perform different operations adequately.

☐ 2. Can perform a limited number of different operations efficiently.

☐ 3. Can perform several different operations with reasonable efficiency.

☐ 4. Can perform many different operations efficiently.

☐ 5. Can perform an unusually large variety of different operations efficiently.

G. Considering all factors already rated, and ONLY these factors, how acceptable was his performance during vocational training?

☐ 1. Performance was unsatisfactory.

☐ 2. Performance was not completely satisfactory.

☐ 3. Performance was satisfactory.

☐ 4. Performance was good.

☐ 5. Performance was outstanding.

RATING TRAINEES

SUGGESTIONS TO RATERS

We are asking you to rate the job performance of the trainees whom you instructed. These ratings will serve as a "yardstick" against which we can compare the test scores in this study. The ratings must give a true picture of each trainee or this study will have very little value. You should strive to give the most accurate ratings possible for each trainee.

These ratings are strictly CONFIDENTIAL and won't affect your trainees in any way. Neither the ratings nor test scores of any trainee will be shown to anyone other than personnel of the ESC testing section. We are interested in only "testing the tests." Ratings are needed for only those trainees who are in the test study.

In making ratings, don't let general impressions or some outstanding trait affect your judgment. Try to forget your personal feelings about the trainee. Rate him only on his performance. Here are some additional points which might help you:

1. Please read and study all directions and the rating scale THOROUGHLY before rating a trainee.

2. For each question compare your trainees with "trainees in general" for this type of vocational training. We want the ratings to be based on the same standards in all training courses covering the same occupation.

3. A suggested method is to rate all trainees on one question at a time. The questions pertain to the different abilities of the trainees. A trainee may be good in one ability and poor in another; for example, a very slow trainee may be very accurate. So rate all trainees on the first question, then rate all trainees on the second question, and so on.

4. Rate the trainees according to the work they have done throughout the entire vocational training course. Don't rate just on the basis of one "good" day, one "bad" day or some single incident. Think in terms of each trainee's usual or typical day by day performance.

5. Rate only on the abilities listed on the rating sheet. Do not let factors such as cooperativeness, ability to get along with others, promptness and honesty influence your ratings. Although these aspects of a worker are important, they are of no value for this study as a "yardstick" against which to compare aptitude test scores.

Please fill in the information requested below.

RATED BY _____ TITLE _____

LOCATION OF TRAINING _____ DATE _____
(CITY) (STATE)

Fact Sheet

Job Title: Cook, Short Order (hotel and rest.) 314.381-010

Job Summary: Prepares and cooks to order food that takes only a short time to prepare. Usually works in a cafeteria, lunchroom, grill, coffee shop, tavern or similar establishment.

Work Performed: Receives verbal or written orders from customers or waitresses. Cooks hamburgers, steaks, chops, eggs, seafood and breakfast foods to order, using hot plate, grill, griddle, broiler or deep fryer. Seasons foods while cooking. Makes coffee, tea, hot chocolate and iced beverages. May also make and serve hot and cold sandwiches, toast, salads and similar dishes. May serve roasts, soups, stews and vegetables from steam table.

Cleans fixtures and equipment. May be required to do related housekeeping duties.

Effectiveness of Norms: Only 65% of the non-test-selected trainees used for this study were good trainees; if the trainees had been test-selected with the above norms, 86% would have been good trainees. 35% of the non-test-selected used for this study were poor trainees; if the trainees had been test-selected with the above norms, only 14% would have been poor trainees.

Applicability of Norms: The aptitude test battery is applicable to jobs which embody a majority of the duties described above.

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